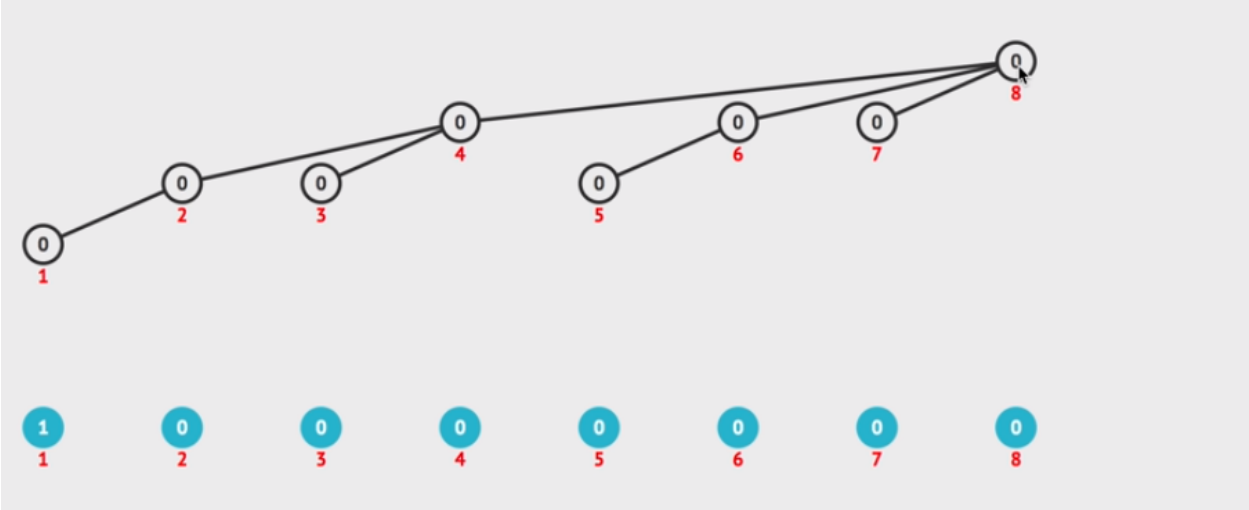
本期节目中我们介绍了Fenwick Tree/Binary Indexed Tree/树状数组的原理和实现以及它在leetcode中的应用。 花花酱 Fenwick Tree / Binary Indexed Tree - 刷题找工作 SP3

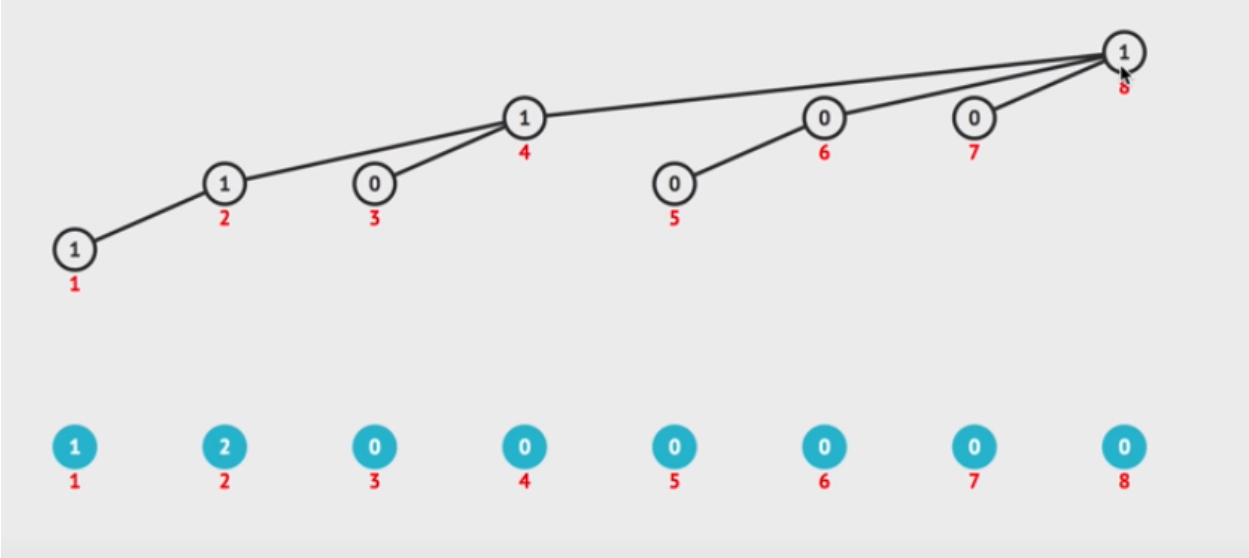
In this episode, we will introduce Fenwick Tree/Binary Indexed Tree, its idea and implementation and show its applications in leetcode.

Fenwick Tree is mainly designed for solving the single point update range sum problems. e.g. what's the sum between i-th and j-th element while the values of the elements are mutable.

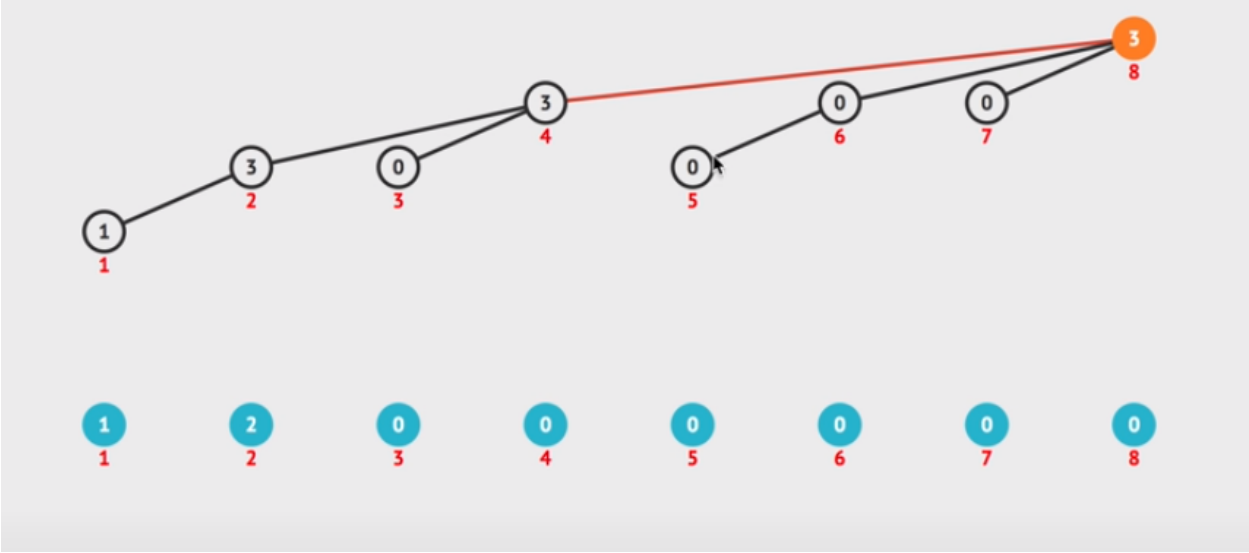
Init the tree (include building all prefix sums) takes O(nlogn)
Update the value of an element takes O(logn)
Query the range sum takes O(logn)
Space complexity: O(n)



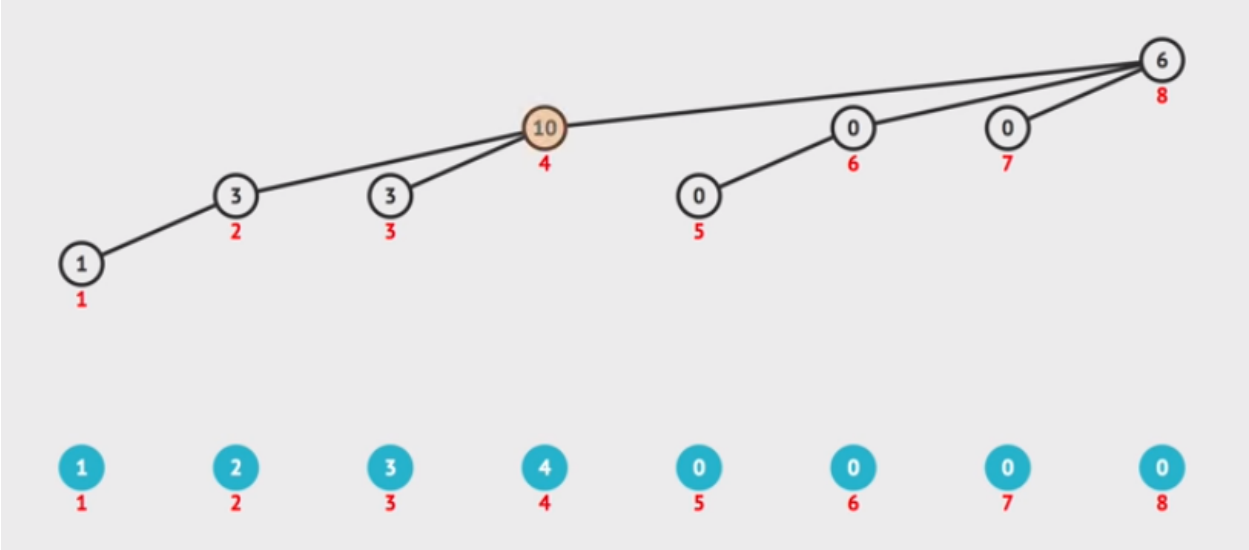
Update the 1st elt (value = 1) , update the sum path (



Update the 2nd elt (value = 2) , update the sum path



Update the 3rd elt (value = 3) , update the sum path



After updating all elts we get:

Input: [1,2,3,4,5,6,7,8] n = 8 lowbit(x) = x & (-x) x=5=0110, -x=~x+1=1001+1=1010, lowbit(x) = 0010